APR 29 1989

FLOOD INSURANCE STUDY

CITY OF NORTON, VIRGINIA
INDEPENDENT CITY

REVISED:
JULY 17, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER - 510108

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
INDEPENDENT CITY OF NORTON, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Independent City of Norton, Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study represent a revision of the original analyses prepared by the Tennessee Valley Authority (TVA) for the Federal Emergency Management Agency (FEMA) under Inter-Agency Agreement No. IAA-H-22-74, Project Order No. 2.

In this revision, the hydrologic and hydraulic analyses for the Powell River were prepared by TVA during the preparation of the Flood Insurance Study for the unincorporated areas of Wise County for FEMA. The work for that study was completed in September 1978.

1.3 Coordination

During the preparation of the original study, TVA engineers met with the city manager and city engineer to review the preliminary flood insurance maps against local knowledge of the flood situation in Norton. Suggestions from the local officials were incorporated into this report.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Independent City of Norton, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: Benges Branch, from the downstream corporate limits to Laurel Avenue; Clear Creek, for its entire length within the community; the Guest River, from the downstream corporate limits to approximately 1,480 feet upstream of U. S. Route 23; and the Powell River for its entire length within the community. This revision incorporates detailed flooding information for the Powell River obtained from the Flood Insurance Study for the unincorporated areas of Wise County. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Portions of Benges Branch and Bear Creek were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Norton.

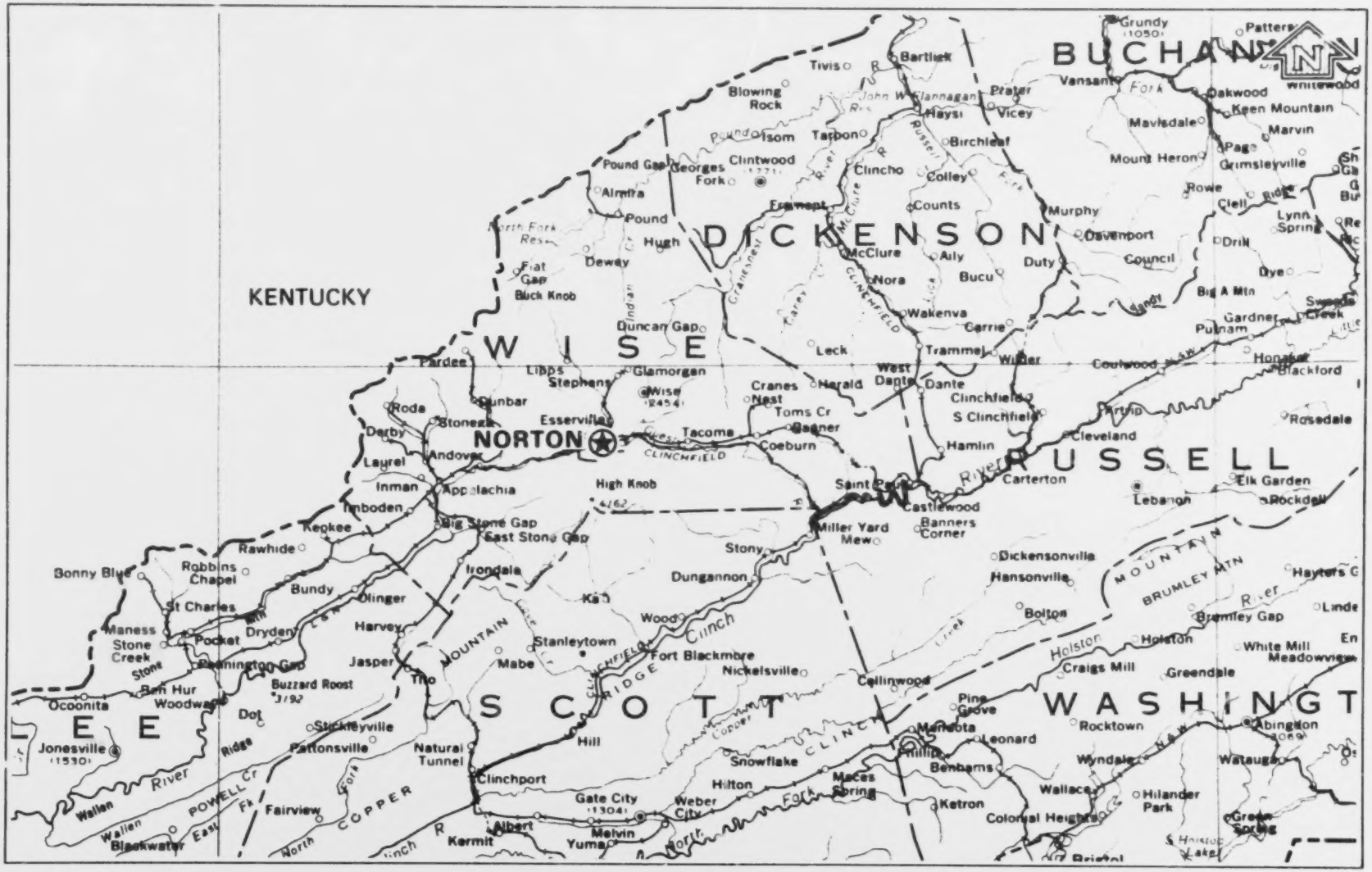
2.2 Community Description

The City of Norton is located in the Appalachian Mountains approximately 60 miles northwest of Bristol in south central Wise County. It is bordered by the unincorporated areas of Wise County on all sides.

Exploration of Wise County began in 1750, and the first established settlements appeared approximately 1770 near the Town of Coeburn. In the earlier days, Wise County's wealth was in its forests, and lumbering was long the chief industry. Today approximately 80 percent of the total area is still in commercial and noncommercial forest. Some lumber and pulpwood is cut, producing many mine timbers and railroad ties.

Other than coke and lumber, manufactured products include dairy products, soft drinks, commercial printing and publishing, apparel, concrete and concrete blocks, mining machinery and equipment, and lime.

The 1980 population of the Independent City of Norton was 4,775, an increase of 14 percent from the 1970 population of 4,173 (Reference 1).


KENTUCKY
BUCHANAN
DICKENSON
WISE
NORTON
RUSSELL
SCOTT
WASHINGTON
LEE
Grundy
Patterson
Vansant
Oakwood
Keen Mountain
Mavisdale
Marvin
Mount Heron
Grimsleyville
Rowe
Lynn Spring
Murphy
Davenport
Drill
Council
Dye
Big A Mtn
Gardner
Putnam
Honaker
Blackford
Coalwood
Rosedale
Elk Garden
Lebanon
Rockdell
Cleveland
Carterton
Castlewood
Miller Yard
Banners Corner
Dickensonville
Hansonville
Bolton
Brumley Gap
Holston
White Mill
Meadowview
Craigs Mill
Greendale
Rocktown
Abingdon
Watauga
Wyndale
Hilander Park
Green Spring
Colonial Heights
Bristol
Ketron
Wallace
Benhams
Leonard
Manabota
Pine Grove
Collinwood
Nickelsville
Fort Blackmore
Stanleytown
Mabe
Stony
Dungannon
Irondale
Big Stone Gap
East Stone Gap
Appalachia
Inboden
Inman
Laurel
Andover
Derby
Roda
Stonega
Esserville
Dunbar
Wise
Glamorgan
Stephens
Lipps
Pardee
Leck
Trammel
Wilder
West Dante
Dante
Clinchfield
S Clinchfield
Cranes Nest
Herald
Toms Cr
Gessner
Tacoma
Coeburn
Hamlin
Duty
Bucu
Nora
McClure
Aily
Wakenva
Carrie
Duncan Gap
Fiat Gap
Buck Knob
Dewey
Hugh
Pound
Almira
Pound Gap
Georges Fork
Clintwood
Isom
Tarbon
Haysi
Vicey
Prater
Birchleaf
Colley
Clincho
Counts
Fremont
Tivis
Bartlick
Blowing Rock
Rawhide
Keokee
Robbins Chapel
Bonny Blue
Bundy
Olinger
St Charles
Drydery
Pocket
Maness
Stone Creek
Pennington Gap
Harvey
Jasper
Thio
Buzzard Roost
Ben Hur
Woodward
Ocoonita
Jonesville
Dot
Stickleyville
Pattonsville
Natural Tunnel
Fairview
Wallen
Blackwater
Kermit
Albert
Yuma
Melvin
Gate City
Weber City
Hilton
Snowflake
Clinchport
Hill
Mace Spring
Ridge
Mountain
Clinch
Powell
North Fork
Copper
Indian
Russell Fork
Knox
Wood
Kay
Tacoma
Esserville
Nest
Toms Cr
Gessner

The Guest River, which is the main source of flooding in the community, flows through Norton from a steep, deeply dissected plateau with very steep valleys and sharp ridge tops. The drainage area of the Guest River within Norton, varies from 25.2 to 48.9 square miles.

2.3 Principal Flood Problems

The highest known flood in Norton occurred on January 28, 1918, as a result of a 2- and 3-inch rain melting 20 to 25 inches of snow. The runoff was most severe due to the unthawed ground. This flood had a recurrence interval of approximately 60 years.

Other notable floods occurred on May 30, 1927, March 23, 1929, April 5, 1936, January 27, 1957, and March 12, 1963. The floods of 1927 and 1929 also had a recurrence interval of 60 years, but ranged approximately 0.5 to 1.5 feet lower in elevation than the flood occurring in 1918. These were all intensive rainfall-generated floods. Hydrologic studies show that a maximum probable rain could cause future flooding up to 10.5 feet above the 1918 flood.

Benges Branch and Clear Creek are also sources of flooding in Norton. Formal records for these streams are nonexistent, but hydrologic studies of similar streams in the area indicate that future flooding can be expected to some extent. Obstructions in the form of inadequate bridges are the major cause for concern on these streams. Both streams are steep and react with rapid rates of rise but longer durations of fall because of the backwater effect caused by the bridges.

Bear Creek is a tributary of the Guest River. Its floodplain is low and flat and, because it is affected primarily by backwater from the Guest River for its entire length within the community, no profiles are shown.

2.4 Flood Protection Measures

No flood control works exist upstream from Norton, but two water supply dams were built by the city on Benges Branch. The lower dam is a 55-foot high concrete arch structure built in 1930 with drainage area of 0.77 square mile. The upper dam is an 80-foot high earthfill structure built in 1956 with drainage area of 0.70 square mile. The dams would have no significant effect upon flood flows within the city and, therefore, this regulatory effect was ignored. The capacity of the dams to pass maximum flood flows without overtopping was investigated to determine, at least from a hydrologic standpoint, if the dams posed a potential downstream hazard. As designed, the lower and upper dams would be overtopped by TVA maximum probable flood by 1.4 and 1.0 feet respectively. This amount of overtopping was judged not to cause dam failure.

Larger floods could occur causing greater overtopping and increasing the potential for failure, but the likelihood of such a flood occurring is so remote that it was not evaluated for the purposes of this study.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

For all streams except the Powell River, flood flow-frequency curves for gaged locations were developed using the log-Pearson Type III distribution, fitting procedures with modifications as dictated by historic flood information and computed maximum flood flows. Maximum flood flows at the gaged site and the streams in the City of Norton were developed using maximum precipitation estimates determined by the National Weather Service. For the Powell River, flow estimates were computed using adopted regional peak flow-drainage area relationships that were tied into the flood flow-frequency values determined from the gage record on the Powell River at the Town of Big Stone Gap.

There are no formal steam gaging sites on the streams within the study area from which flood flow-frequency relationships could be developed. The nearest formal record is approximately 16 miles downstream on the Guest River at Town of Coeburn, which has been

gaged from 1950 to date. The local flood report was developed from information obtained from newspaper reports after the Guest River floods of 1918 and 1929. Also, following the 1957, 1963, and 1969 floods, field inspections were documented and flood flow-frequency curves for the Guest River, Clear Creek, and Benges Branch for the study sites were determined by comparison with curves developed form gage records in the region. These were further supported by the limited available historical data on the Guest River at Norton and previous regional studies prepared by the U. S. Geological Survey (USGS) (Reference 2).

Drainage area-peak discharge relationships for streams in the study area are compared with other streams in the region (Figure 2).

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses of the streams studied by detailed methods were field surveyed and were located at close intervals above and below bridges in order to compute the backwater effects of these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Water-surface elevations of the floods for the selected recurrence intervals were computed using a step-backwater computer program developed by TVA (Reference 3). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

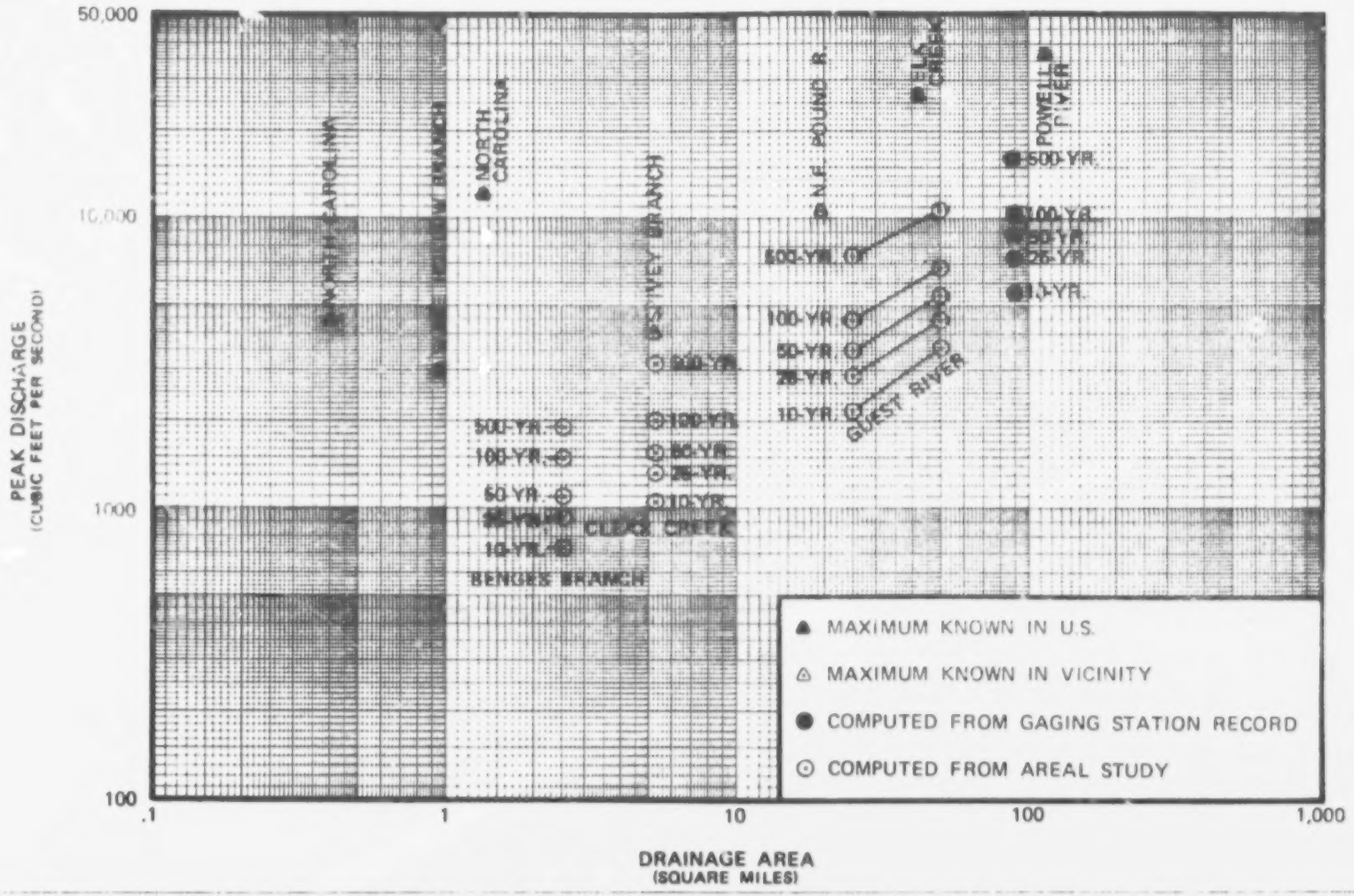


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA

(INDEPENDENT CITY)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

GUEST RIVER, CLEAR CREEK, AND BENGHES BRANCH

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing floodplain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (Reference 4).

For the streams studied by approximate methods, the 100-year flood boundary was delineated using the previous Flood Insurance Study for the Independent City of Norton (Reference 5).

The 100- and 500-year floodplain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments by setting encroachments in the stream overbanks, testing these with the HEC-2 program, and adjusting and retesting them until an allowable increase in flood elevation was reached (Reference 6). This procedure has been used by TVA for many years to provide technical floodplain management assistance to Tennessee Valley communities.

In this procedure, the floodway limit lines are located to allow the use of some presently flood-prone areas at the expense of some increases in flood levels. The limit lines are located in a manner that provides land where it is estimated to serve the community's needs best. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 1). Portions of the floodway widths for Benges Branch extend beyond the corporate limits. Floodway boundaries for Bear Creek, extending approximately 3,500 feet upstream of its confluence with the Guest River, are shown as adopted. The hydraulic model needed to compute a floodway was not developed; therefore, no floodway data are provided for Bear Creek.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the City of Norton.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Benges Branch								
A d.s.*	0.24	65	145	7.1	2,028.1	2,028.1	2,028.1	0.0
A u.s.	0.24	65	1,045	1.3	2,040.8	2,040.8	2,041.6	0.8
B	0.33	90	625	2.2	2,041.5	2,041.5	2,042.3	0.8
C	0.54	90	230	6.1	2,050.2	2,050.2	2,050.2	0.0
D	0.62	70	220	6.3	2,054.2	2,054.2	2,054.4	0.2
E d.s.*	0.73	125	520	2.7	2,069.9	2,069.9	2,069.9	0.0
E u.s.	0.73	125	635	2.2	2,070.2	2,070.2	2,070.5	0.3
F d.s.*	0.93	135	335	4.1	2,094.7	2,094.7	2,094.7	0.0
F u.s.	0.93	135	500	2.8	2,095.3	2,095.3	2,096.1	0.8
G d.s.*	1.17	140	145	9.5	2,141.4	2,141.4	2,141.6	0.2
G u.s.	1.17	140	1,345	1.1	2,156.6	2,156.6	2,157.3	0.7
H d.s.*	1.38	70	115	12.1	2,189.8	2,189.8	2,189.8	0.0
H u.s.	1.38	70	315	4.4	2,193.0	2,193.0	2,193.3	0.3
I	1.44	90	120	11.7	2,210.1	2,210.1	2,210.1	0.0
Clear Creek								
A	0.14	150	635	3.2	2,081.4	2,081.4	2,081.8	0.4
B d.s.*	0.18	165	225	9.0	2,081.4	2,081.4	2,081.8	0.4
B u.s.	0.18	165	715	2.8	2,084.7	2,084.7	2,085.1	0.4
C	0.26	150	420	4.7	2,090.9	2,090.9	2,090.9	0.0
D d.s.*	0.37	165	280	7.1	2,103.2	2,103.2	2,103.2	0.0
D u.s.	0.37	165	370	5.4	2,104.7	2,104.7	2,104.7	0.0

[1]Miles above mouth
*Downstream and upstream at bridge sections

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

FLOODWAY DATA

BENGES BRANCH AND CLEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Guest River								
A d.s.*	19.80	250	1,660	3.7	2,069.8	2,069.8	2,070.1	0.3
A u.s.	19.80	250	1,670	3.6	2,069.8	2,069.8	2,070.2	0.4
B d.s.*	19.90	300	2,015	3.0	2,070.4	2,070.4	2,070.7	0.3
B u.s.	19.90	300	2,055	3.0	2,070.6	2,070.6	2,070.9	0.3
C d.s.*	20.38	560	2,420	2.1	2,072.7	2,072.7	2,072.8	0.1
C u.s.	20.38	560	2,575	1.9	2,073.1	2,073.1	2,073.1	0.0
D d.s.*	20.82	215	1,075	4.4	2,076.7	2,076.7	2,077.3	0.6
D u.s.	20.82	215	1,100	4.3	2,077.0	2,077.0	2,077.4	0.4
E	21.18	160	495	9.5	2,080.9	2,080.9	2,081.3	0.4
F	21.57	170	990	4.7	2,085.6	2,085.6	2,085.6	0.0
G d.s.*	21.84	300	1,365	3.4	2,088.0	2,088.0	2,088.0	0.0
G u.s.	21.84	300	1,755	2.7	2,088.4	2,088.4	2,088.4	0.0
H d.s.*	22.11	170	1,330	3.5	2,090.4	2,090.4	2,091.0	0.6
H u.s.	22.11	170	1,445	3.2	2,091.4	2,091.4	2,091.9	0.5
I	22.25	280	1,335	3.5	2,092.1	2,092.1	2,092.6	0.5
J d.s.*	22.59	260	1,780	2.6	2,093.0	2,093.0	2,093.3	0.3
J u.s.	22.59	260	1,865	2.5	2,093.6	2,093.6	2,093.8	0.2
K	22.88	270[2]	1,875	2.4	2,094.8	2,094.8	2,094.9	0.1
L d.s.*	23.16	220[2]	1,520	3.0	2,096.7	2,096.7	2,096.9	0.2
L u.s.	23.16	220[2]	1,580	2.9	2,097.3	2,097.3	2,097.3	0.0
M	23.35	290[2]	1,135	4.0	2,099.5	2,099.5	2,099.6	0.1
N d.s.*	23.62	300[2]	1,265	3.6	2,107.4	2,107.4	2,107.4	0.0
N u.s.	23.62	300[2]	880	5.1	2,107.4	2,107.4	2,107.4	0.0

[1]Miles above mouth
[2]This width extends to corporate limits
*Downstream and upstream at bridge sections

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

FLOODWAY DATA

GUEST RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATIONS			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Powell River								
A d.s.*	193.21	155/115[2]	1,199	3.6	2,017.7	2,017.7	2,018.4	0.7
A u.s.	193.21	155/115[2]	1,288	3.3	2,018.3	2,018.3	2,019.0	0.7

[1]Miles above confluence with the Clinch River
[2]Width/width within corporate limits
*Downstream and upstream at bridge sections

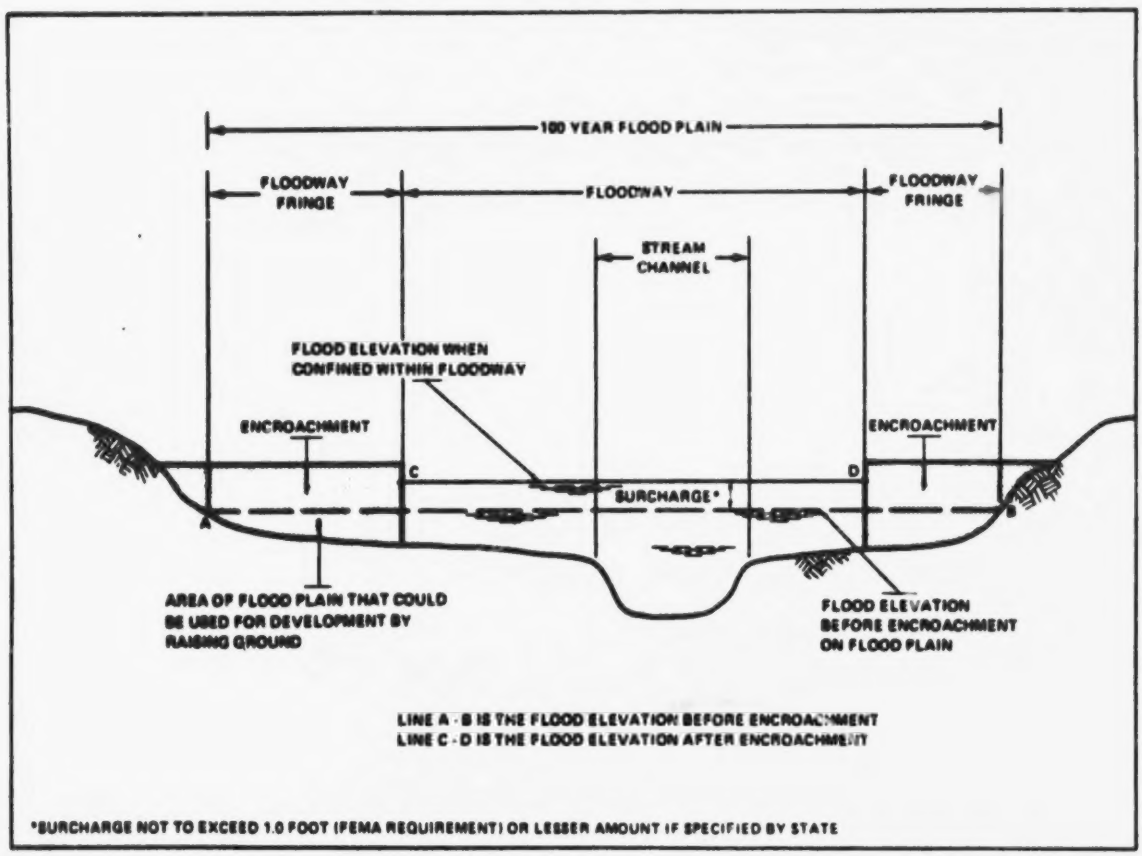
TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

FLOODWAY DATA

POWELL RIVER


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

Floodway Schematic - Figure 3

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the City of Norton is shown on the Flood Profiles (Exhibit 1) and summarized in Table 2.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Benges Branch							
Reach 1	01	-1.2	-0.3	+0.3	010	A2	Varies
Reach 2	01	-6.9	-3.3	+7.5	070	A14	Varies
Reach 3	01	-5.6	-2.4	+7.2	055	A11	Varies
Reach 4	01	-2.8	-1.4	+4.3	030	A6	Varies
Reach 5	01	-1.1	-0.4	+0.7	010	A2	Varies
Reach 6	01,04	-6.7	-1.7	+1.1	065	A13	Varies
Reach 7	04	-3.6	-0.9	+1.2	035	A7	Varies
Clear Creek							
Reach 1	02	-3.3	-1.0	+4.1	035	A7	Varies
Reach 2	02	-2.1	-0.6	+4.6	020	A4	Varies
Reach 3	02	-0.7	-0.3	+2.9	005	A1	Varies
Reach 4	02	-1.8	-0.8	+1.6	020	A4	Varies
Reach 5	02	-0.6	-0.3	+0.6	005	A1	Varies
Guest River							
Reach	02	-3.3	-1.0	+4.1	035	A7	Varies
Powell River							
Reach 1	01	-2.7	-0.6	+2.4	025	A5	Varies
Bear Creek							
Reach 1	02	-3.3	-1.0	+4.1	035	A7	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

FLOOD INSURANCE ZONE DATA

BENGES BRANCH, CLEAR CREEK, GUEST RIVER, POWELL RIVER AND BEAR CREEK

relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one- half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zone A1, A2, A4, A5, A6, A7, A11, A13, A14:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.
Zone D:	Areas of undetermined, but possible, flood hazard.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 2.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Independent City of Norton is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

A Flood Insurance Study is currently being prepared for the unincorporated areas of Wise County (Reference 7). The results of that study will be in exact agreement with the results of this study.

Due to its more up-to-date nature, this study supersedes the previous Flood Insurance Study for the Independent City of Norton (Reference 5).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

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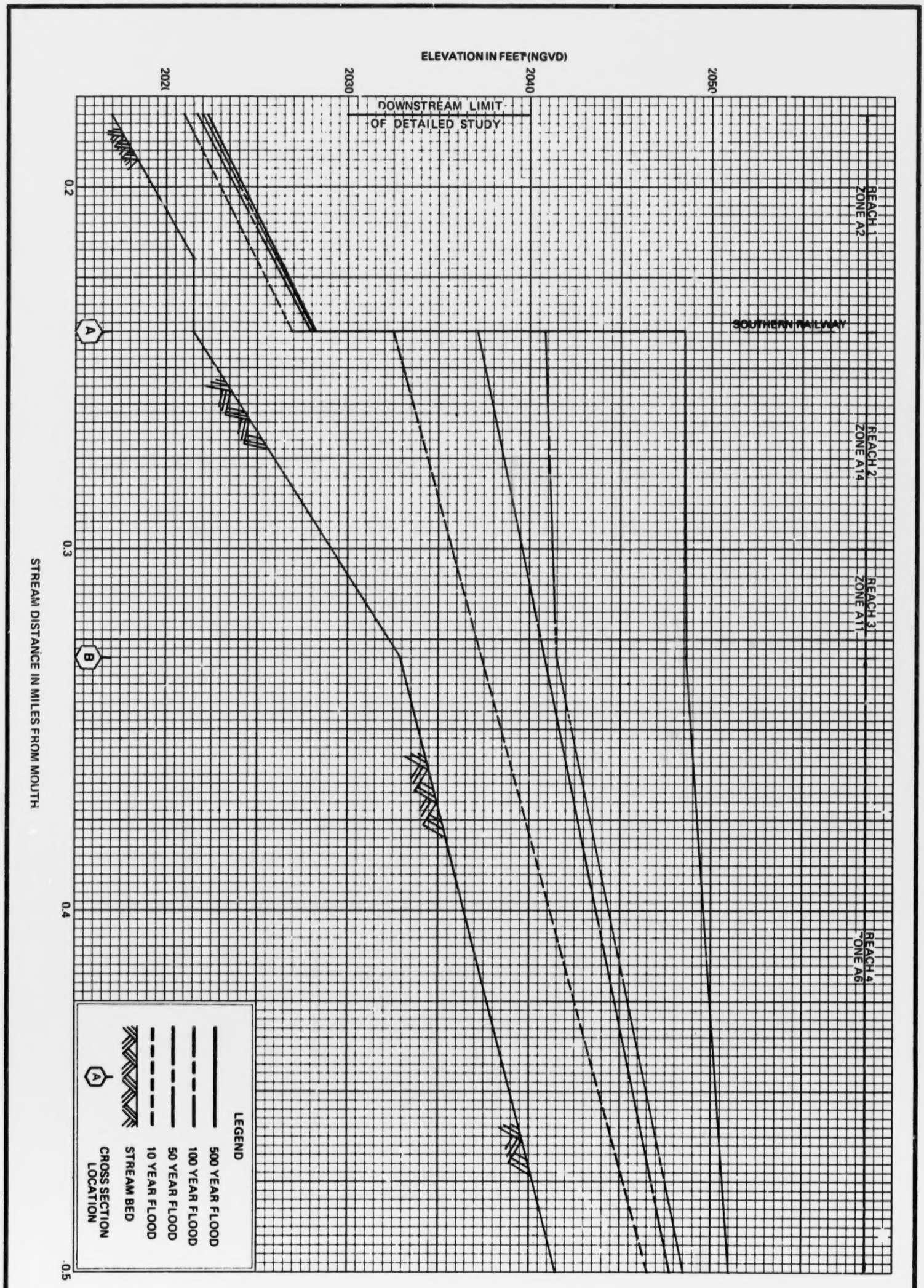


FEDERAL EMERGENCY MANAGEMENT AGENCY

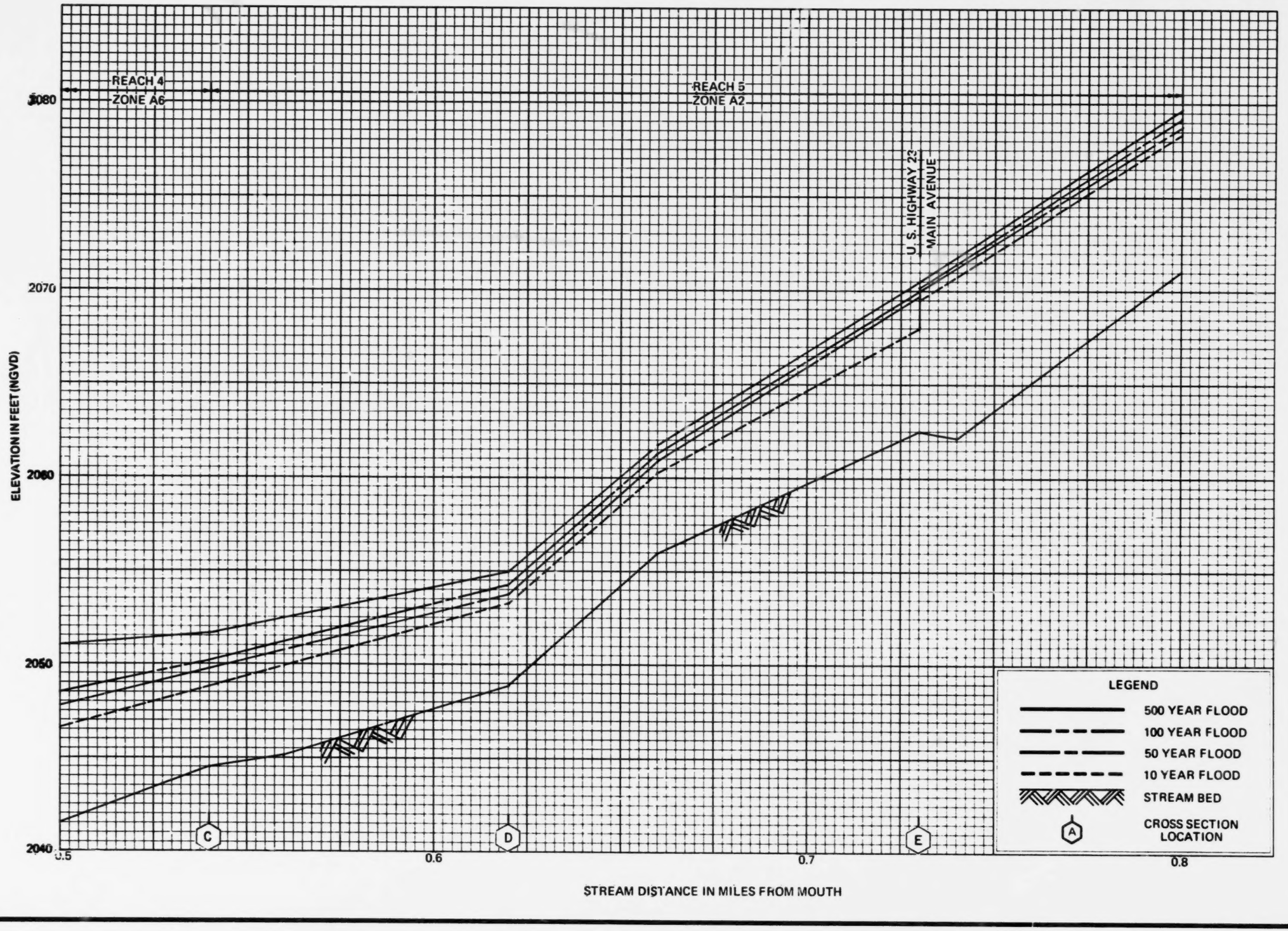
CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

BENGES BRANCH

01P



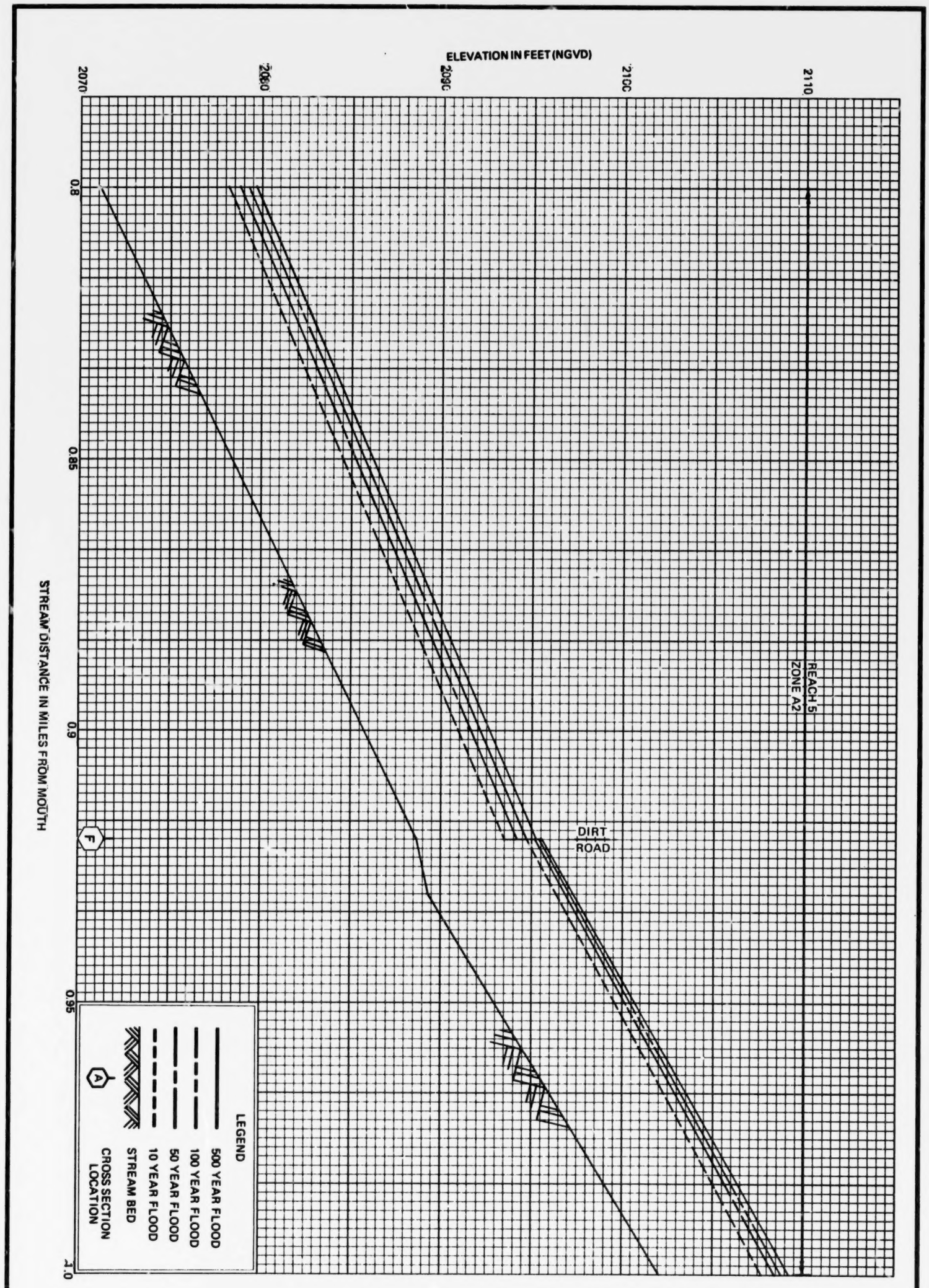
FLOOD PROFILES

BENGES BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

02P



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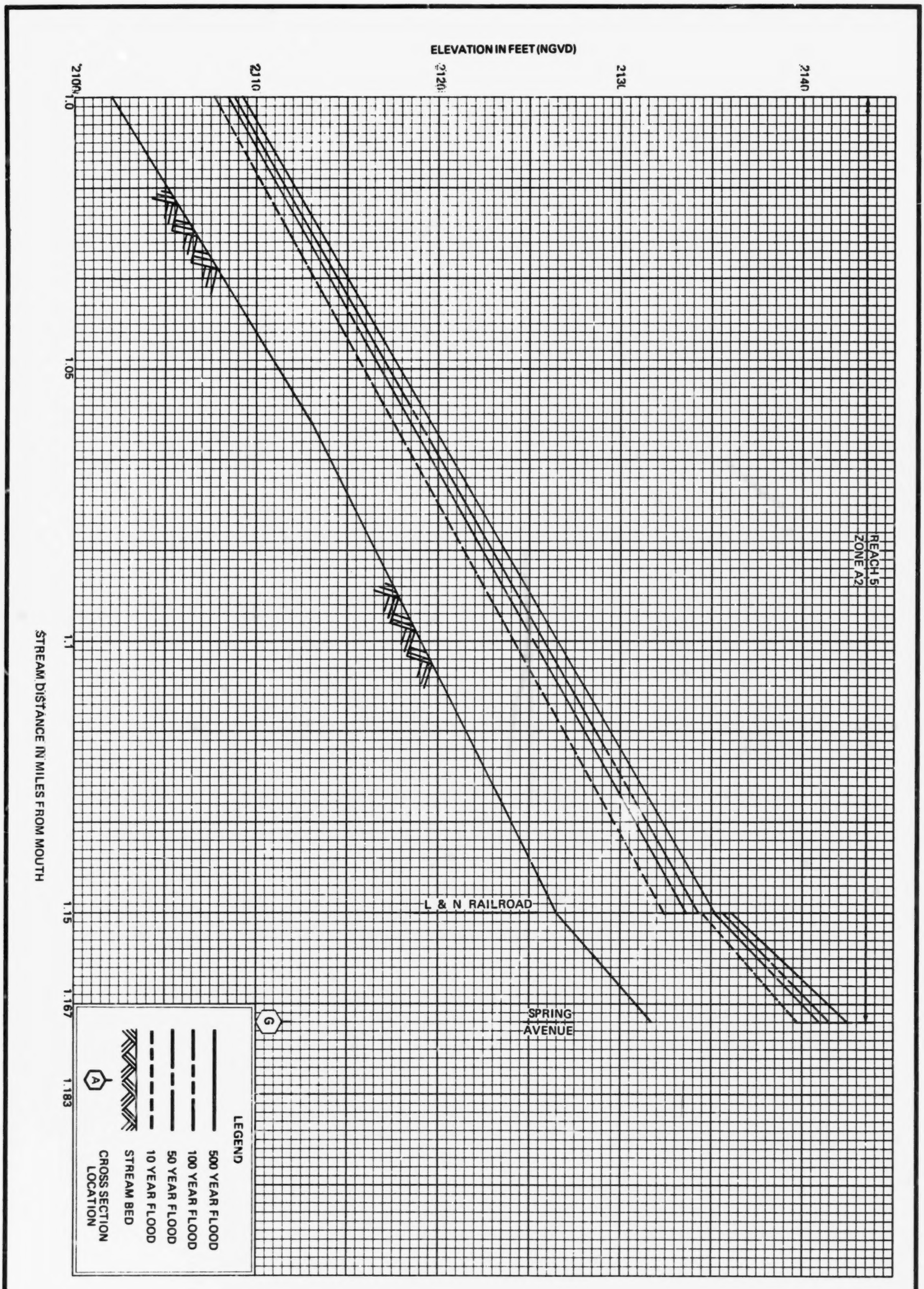

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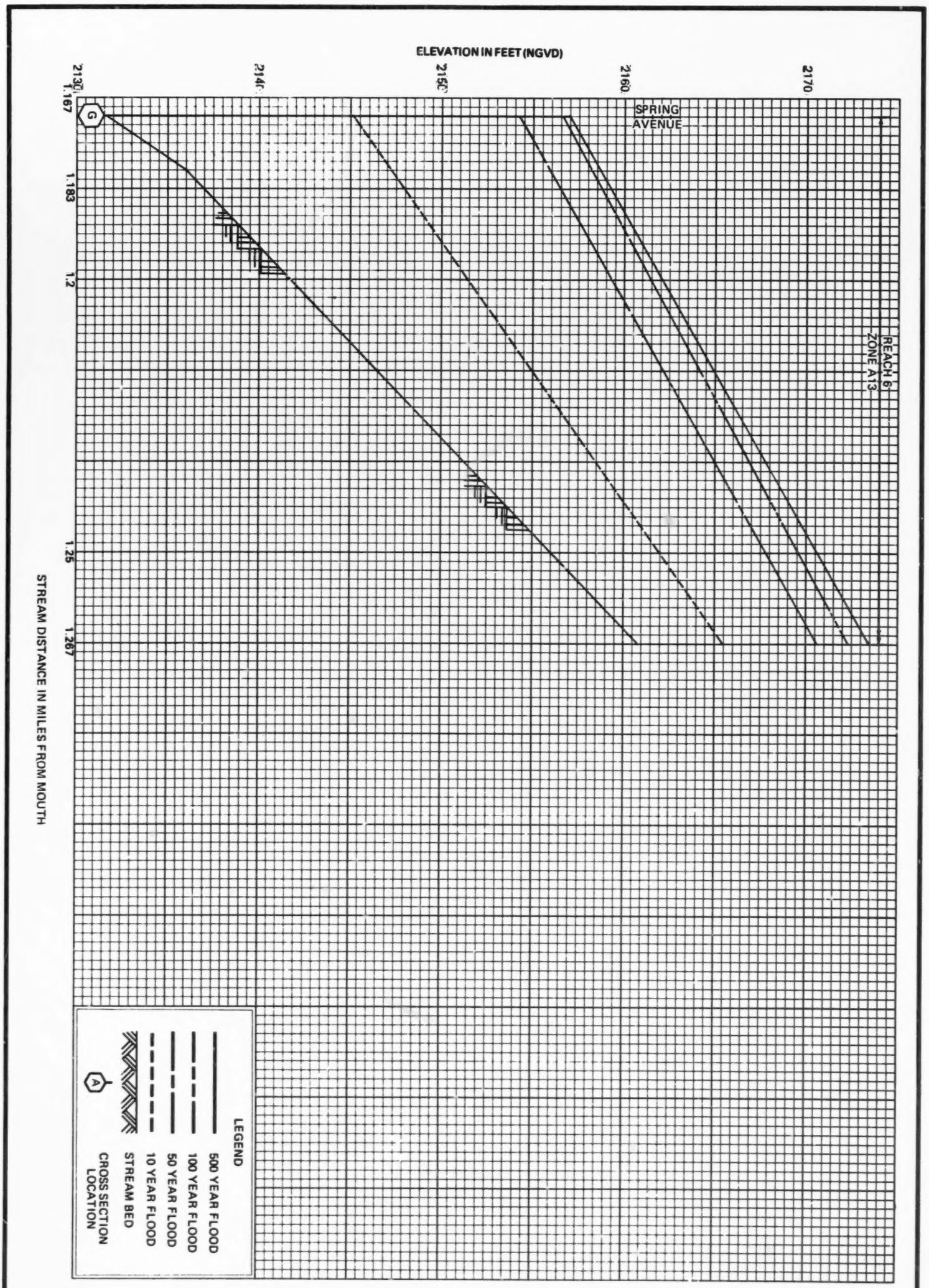
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

BENGES BRANCH



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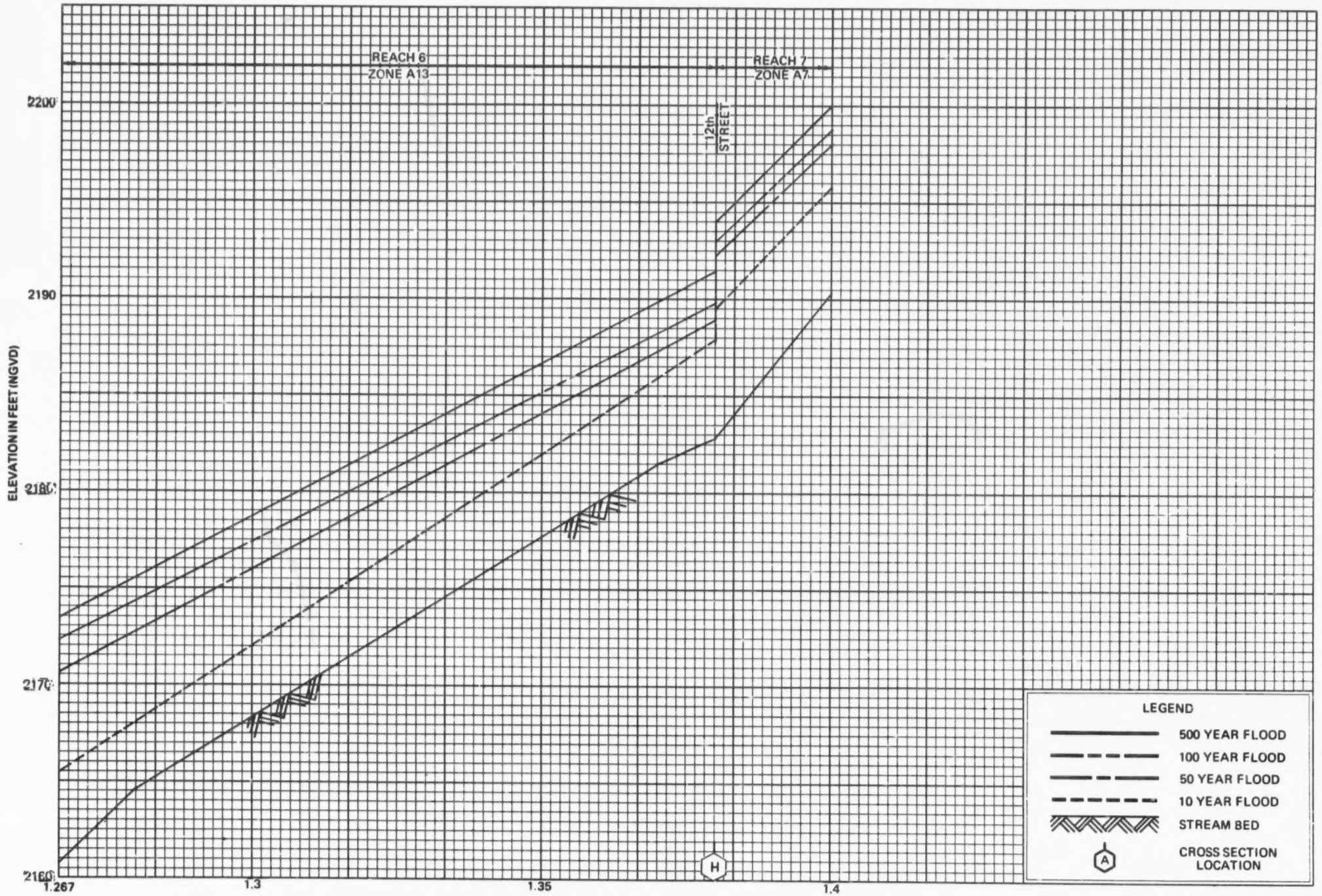
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

BENGES BRANCH



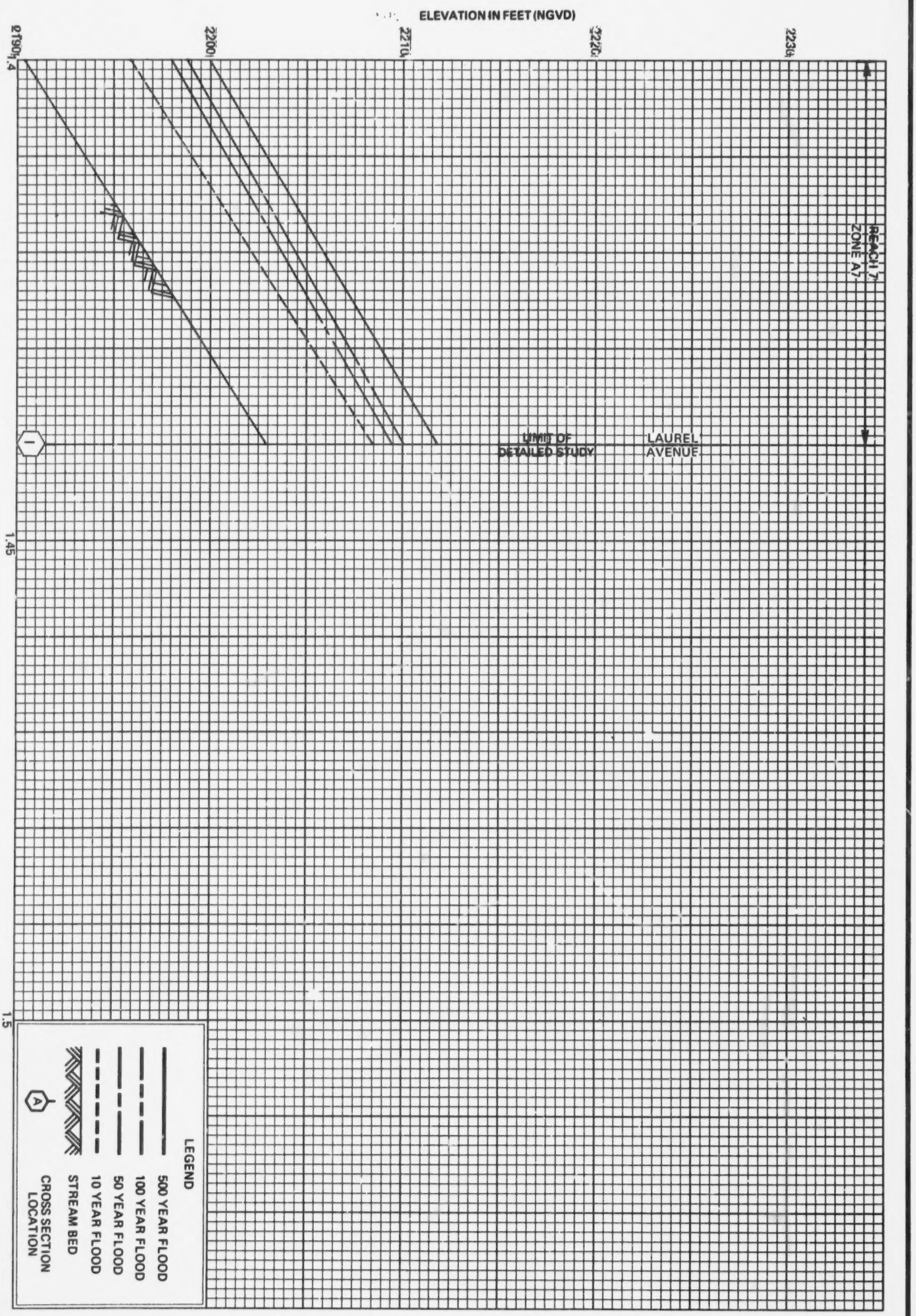
FLOOD PROFILES

BENGES BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

06P



FEDERAL EMERGENCY MANAGEMENT AGENCY

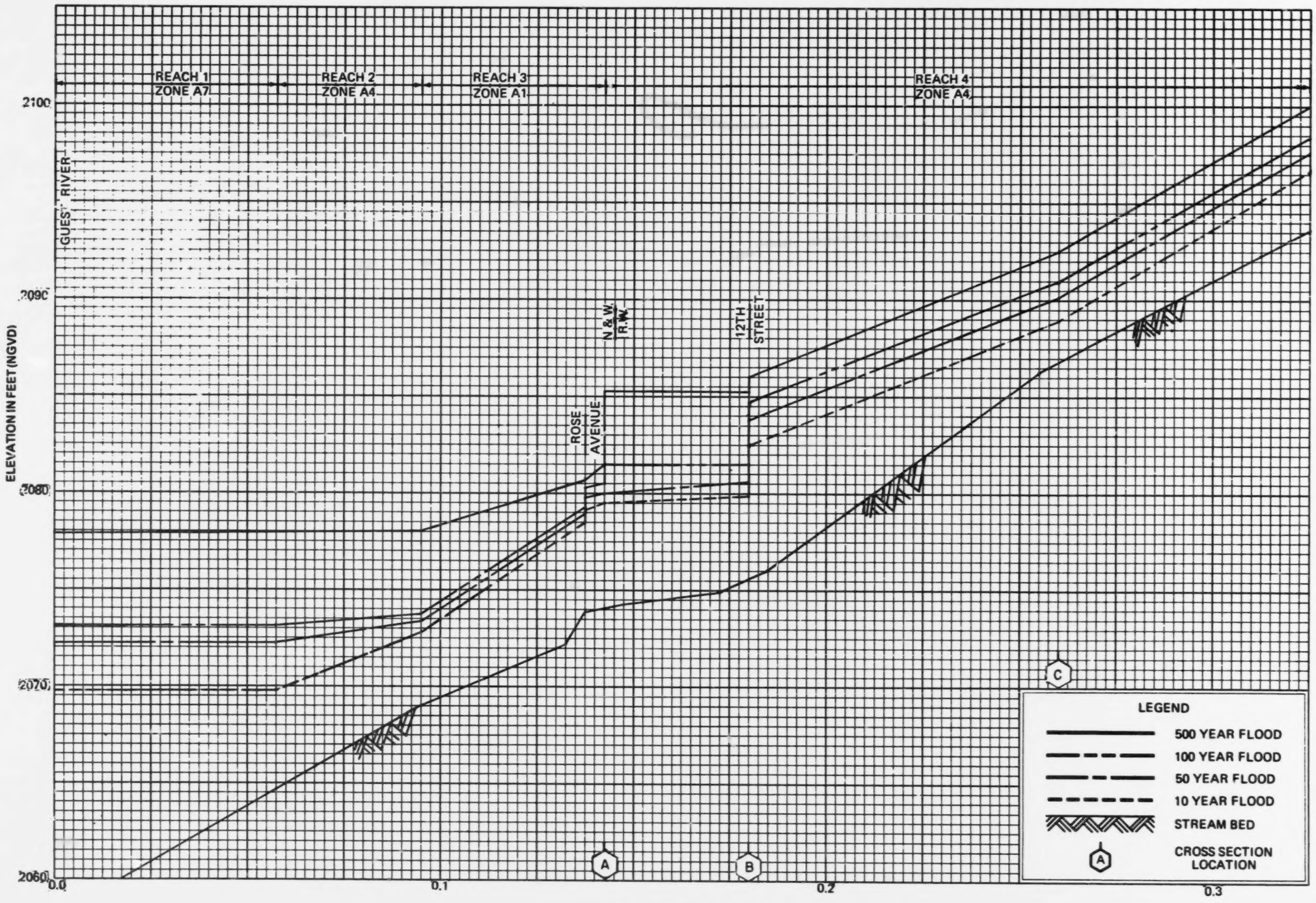
CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

BENGES BRANCH

07P



FLOOD PROFILES

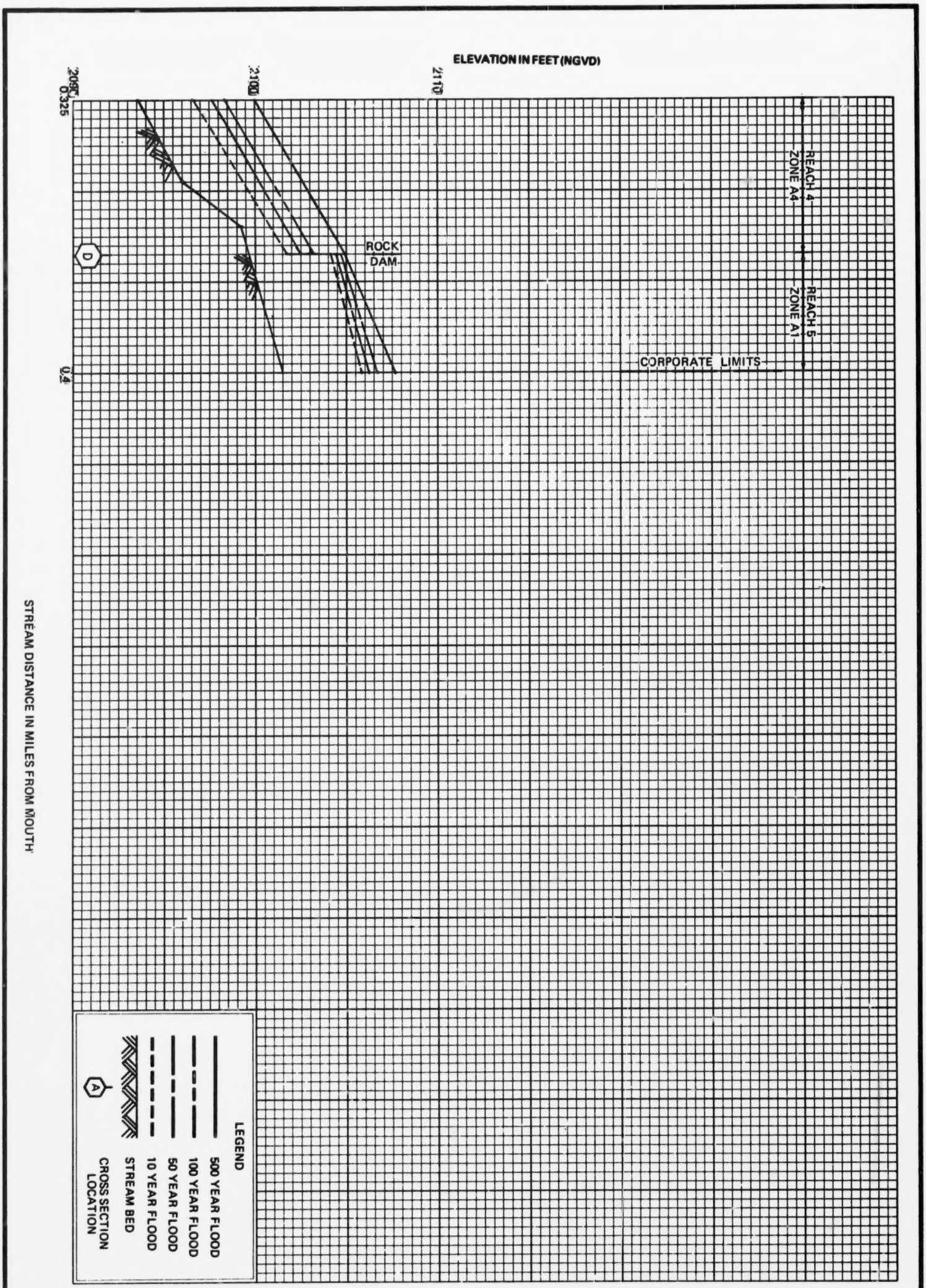
CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA

(INDEPENDENT CITY)

08P



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FEDERAL EMERGENCY MANAGEMENT AGENCY

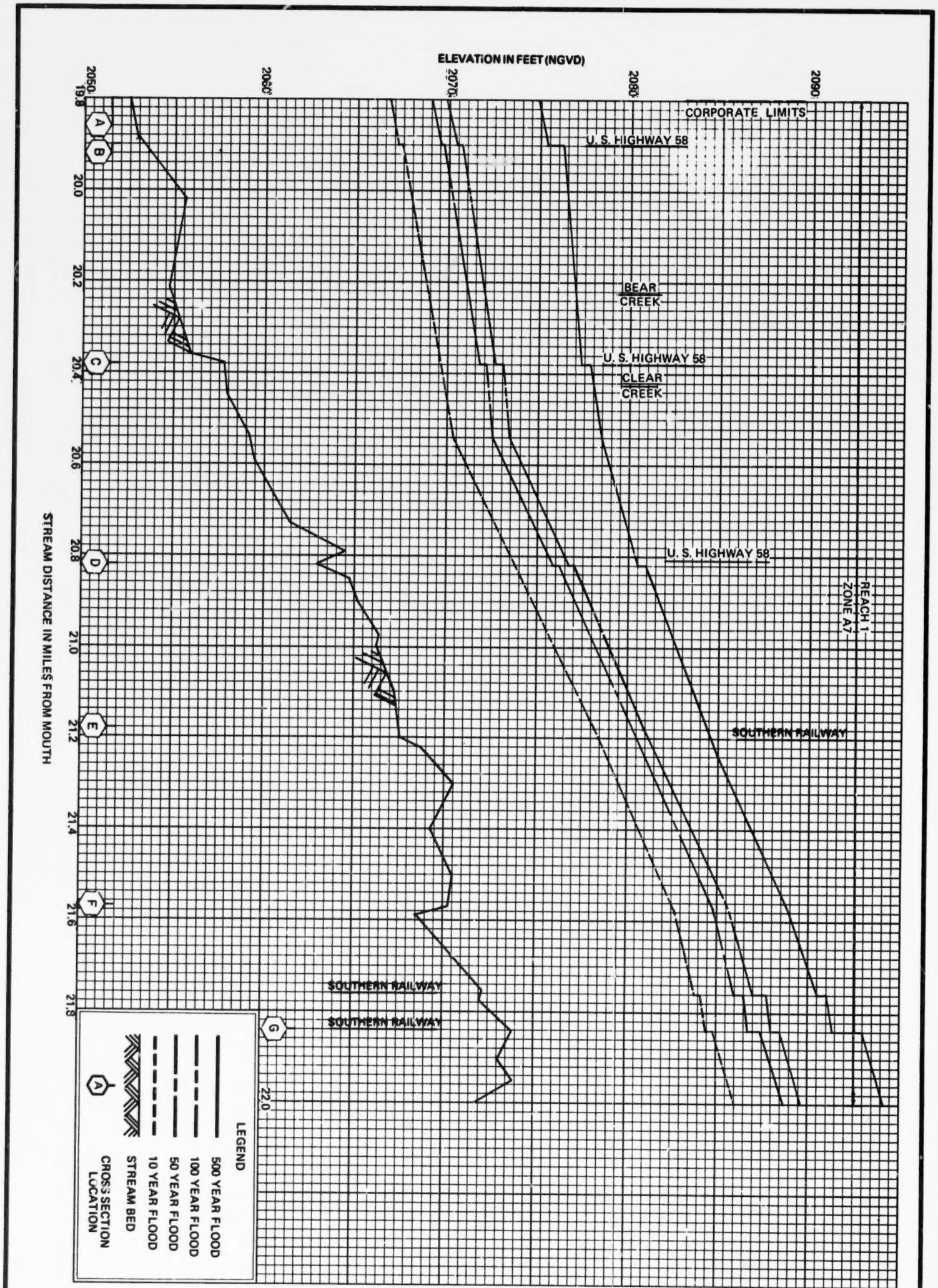
CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

CLEAR CREEK

26



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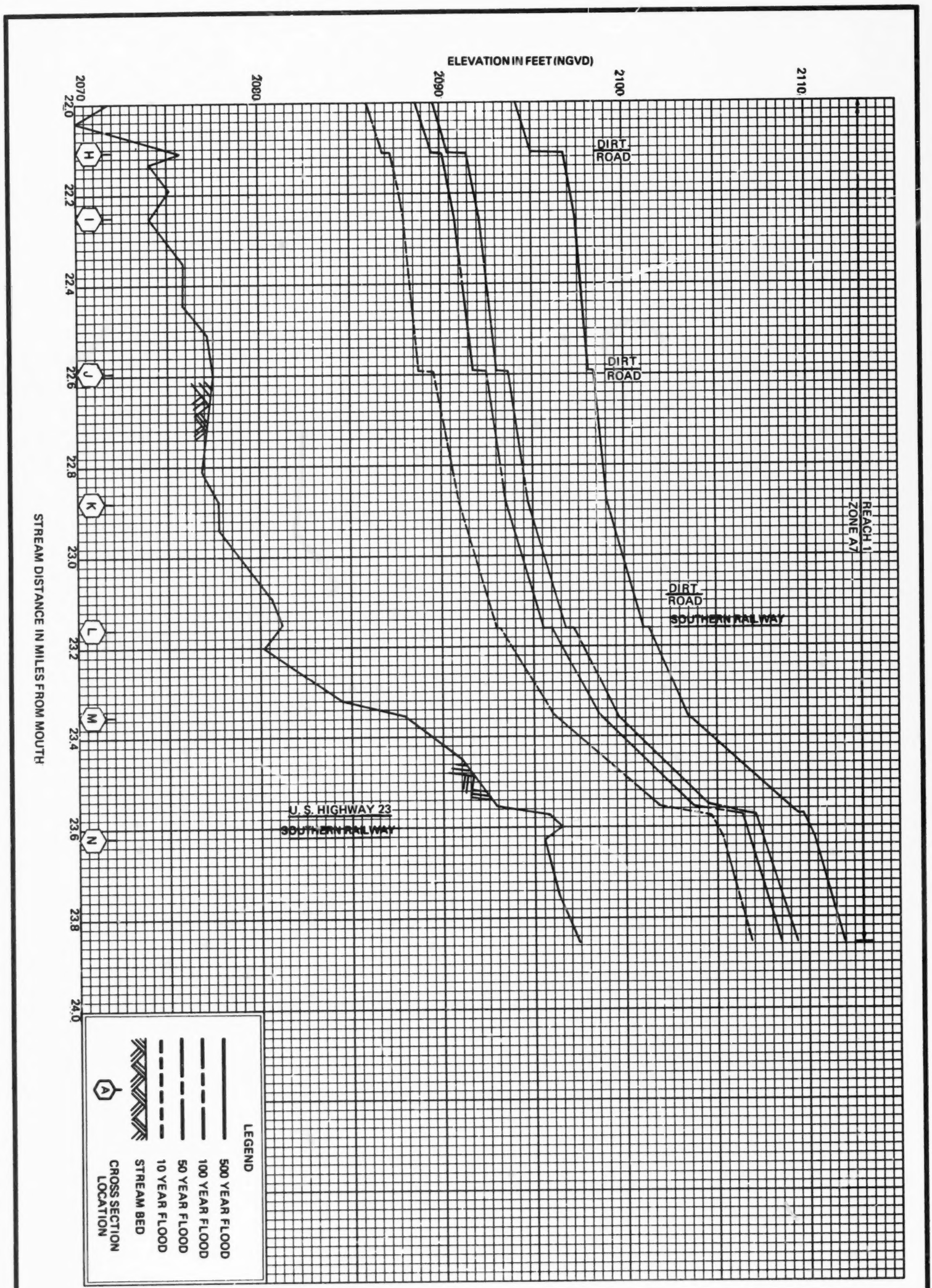
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA

(INDEPENDENT CITY)

FLOOD PROFILES

GUEST RIVER



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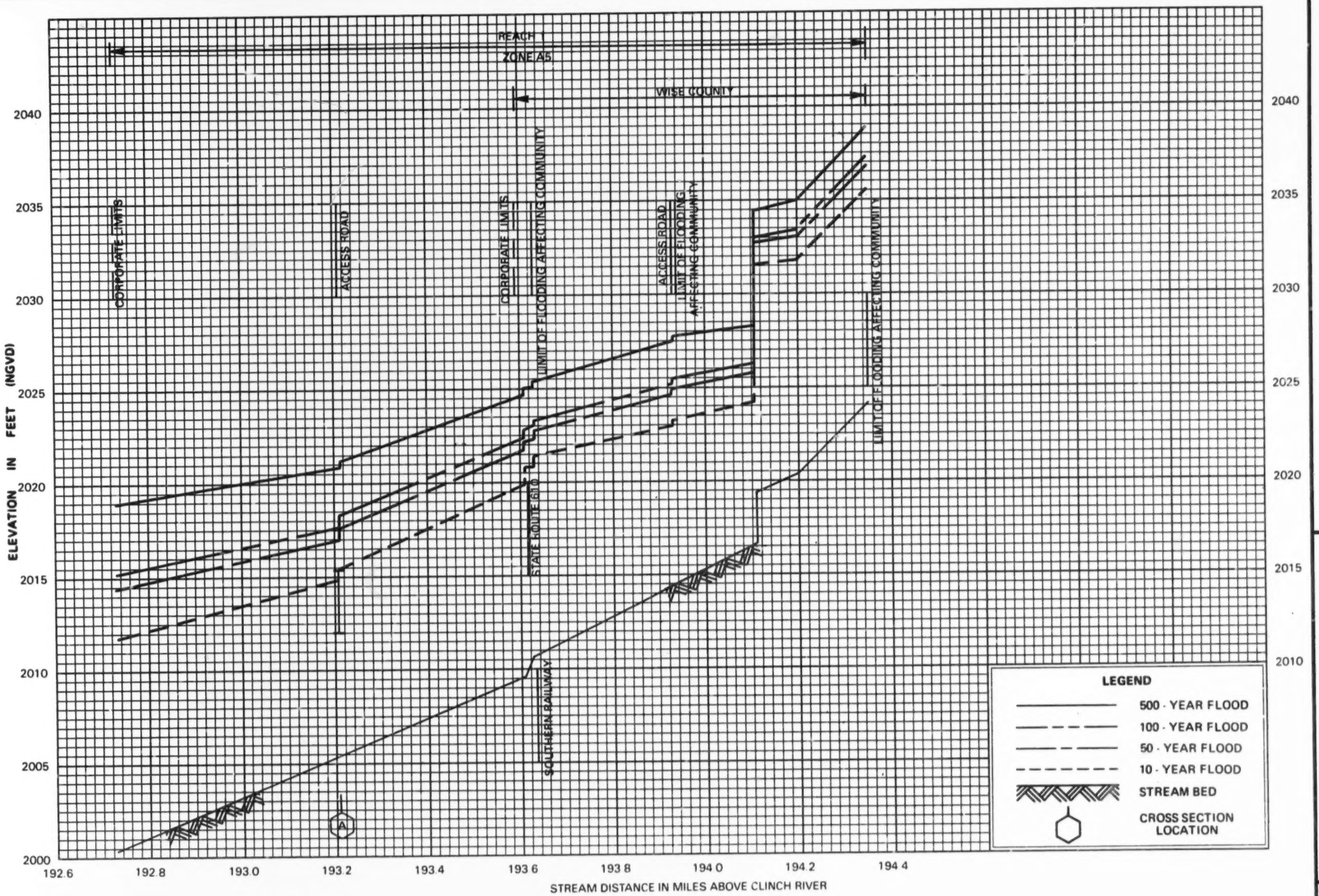

FLOOD PROFILES

POWELL RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NORTON, VA
(INDEPENDENT CITY)

12P

135365